



**Fire Sprinkler System Standard for
One- and Two- Family Dwellings**

(NFPA 13D-2019)

Effective Date: January 1, 2020

2019 CBC 903.3.1.3 NFPA 13D sprinkler systems. Automatic sprinkler systems installed in one- and two-family dwellings, Group R-3, and townhouses shall be permitted to be installed throughout in accordance with NFPA 13D as amended in Chapter 35.

1.0 PERMITS

1.1 This handout supplements the San Jose Fire Department's (SJFD) handout "**FIRE SPRINKLER SYSTEMS DESIGN, INSTALLATION, AND PLAN SUBMITTAL REQUIREMENTS**" (<AS> SYSTEMS). See <AS> SYSTEMS for submittal and inspection requirements.

2.0 DESIGN

2.1 Controls, Valves, and Waterflow Alarms

2.1.1 13D Section 6.2.3 Where more than one dwelling unit is served by the same water supply pipe, each dwelling unit shall have an individual control valve that serves the fire sprinkler system in that dwelling unit and the owner shall have access to the valve that controls the sprinkler system in their unit.

2.1.2 13D Section 6.2.3.1 The control valve shall be permitted to serve the domestic water supply.

2.1.3 13D Section 6.2.3.2 In the situation addressed by 6.2.3, no valve controlling the sprinkler system in a unit shall be located in another unit.

Note: See Page 5 of 5 for Example.

2.1.4 13D Section 7.6 **Replaced** with:
Local water flow alarms shall be provided on all sprinkler systems in homes.

2.2 Attic Protection

2.2.1 13D Section 8.3.11 **Added** Pilot sprinklers shall be provided in the attics and between floors where floor/ceiling assemblies consist of open web wood joists or trusses. Pilot sprinklers shall be intermediate temperature rated, K=4.2, quick response. Pilot sprinklers shall be located within twelve inches of the structure and/or at the apex of each ridgeline when applicable. A sprinkler is required where the ridgeline and hips converge. Sprinklers shall be spaced at maximum thirty feet centers (maximum fifteen feet from

outside walls) and shall be located at all heat and fire sources including furnaces, hot water heaters, above kitchen ranges, etc.

Note: Similar to the requirements of NFPA 13 when sprinklers are required in attics/concealed spaces, pilot sprinklers shall be provided in these spaces where the depth of the space exceeds 6 inches, measured after insulation. Otherwise, the attic shall be fully insulated. If the attic will be fully insulated, the installing contractor shall obtain approval from the San Jose Fire Department prior to covering pipe (sheet rocking). Where attic spaces used for storage the sprinkler design shall be as directed below in the amendment to section 903.2.18.

2.3 Exterior Projections, Utility/Equipment Rooms, and Garages

2.3.1 13D Section 8.3.4 **Deleted.** Hence, sprinklers shall be required to be installed under exterior roofs, canopies, balconies, decks, or similar projections exceeding 4 feet in width and in garages, open attached porches, carports, and similar structures. Sprinklers shall be designed commensurate with the design area for the residence.

Note: Sprinklers and components in exterior locations or locations open to the exterior shall be listed as corrosion resistant.

2.3.2 The following 13D Sections are **deleted** per SJ Ordinances: Section 8.3.5, Section 8.3.5.1, Section 8.3.5.1.1, Section 8.3.5.1.2, Section 8.3.6, Section 8.3.8

2.3.3 13D Section 8.3.10 **Added** Where sprinklers may be subject to excess temperature such as closets containing heat producing equipment, unconditioned garages, Exterior unconditioned space, etc., intermediate temperature sprinklers shall be required.

2.3.4 CFC Section 903.2.18 is **amended** by SJFD Ordinance as follows:

Group U private garages and carports accessory to R-3 occupancies. Carports with habitable space above and attached garages, accessory to Group R-3 occupancies, shall be protected by residential fire sprinklers in accordance with this section. Residential fire sprinklers shall be connected to and installed in accordance with an automatic residential fire sprinkler system that complies with NFPA 13D as amended by San José. Fire sprinklers shall be residential sprinklers or quick-response sprinklers, design to provide a minimum density of 0.05 gpm/ft² (2.04 mm/min) over the area to the garage and/or carport, but not to exceed two sprinklers for hydraulic calculation purposes. Garage doors shall not be considered obstructions with respect to sprinkler placement.

Note: As further discussed below, sprinklers are limited to the conditions of their listing. Hence, residential sprinklers or quick-response sprinklers may be spaced free of obstruction in accordance to their listing restrictions, in general, 400 sf or 225 sf respectively)

2.4 Sprinklers

2.4.1 13D Section 7.5 **Add** the following:

7.5.10 Spare sprinklers shall be provided as required by NFPA 13 – 2019, Section 16.2.7

2.5 Piping

2.5.1 13D Section 10.4.9 **Deleted.**

2.6 Solar Photovoltaic Panel Structures

2.6.1 13D Section 8.3.10 and 8.3.10.1 **ADDED** as follows:

8.3.10 Solar photovoltaic panel structures.

8.3.10.1 Sprinklers shall be permitted to be omitted from the following structures:

(1) Solar photovoltaic panel structures with no use underneath. Signs may be provided, as determined by the enforcing agency prohibiting any use underneath including storage.

(2) Solar photovoltaic (PV) panels supported by framing that have sufficient uniformly distributed and unobstructed openings throughout the top of the array (horizontal plane) to allow heat and gases to escape, as determined by the enforcing agency.

2.7 Water Supplies

2.7.1 San Jose is provided service by 3 different water purveyors. All 3 require the sprinkler system to be supplied through a water meter. The minimum size meter allowed for a new service is 1". The water company may require the meter be larger. An allowance to use an existing meter smaller than 1" may be approved if hydraulic calculations and field verification prove the meter can deliver sufficient supply.

2.7.2 13D Section 6.2.2.1 **ADDED** as follows:

6.2.2.1 Where a fire sprinkler system is supplied by a stored water source with an automatically operated means of pressurizing the system other than an electric pump, the water supply may serve the sprinkler system only.

2.7.3 13D Section 6.2.4 **ADDED** as follows:

13D Section 6.2.4 - Where a water supply serves both domestic and fire sprinkler systems, 5 gpm (19 L/min) shall be added to the sprinkler system demand at the point where the systems are connected, to determine the size of common piping and the size of the total water supply requirements where no provision is made to prevent flow into the domestic water system upon operation of a sprinkler. For multipurpose piping systems, the 5 gpm (19 L/min) demand shall be added at the domestic connection nearest the design area. This demand may be split between two domestic connections at 2.5 gpm (10 L/min) each.

3.0 Hydraulic Calculations

3.1 All hydraulic calculations shall include a copy of the Water Supply Letter from the Water Company that states the water-flow data was verified within six months of the submittal date or within the verification date provided by the water company on the letter. Water-flow data may be obtained from the San Jose Water Company, San Jose Municipal Water Company or Great Oaks Water

3.2 Hydraulic calculations shall require a pressure cushion that is a minimum 10% of the water supply data.

3.3 The backflow prevention requirements for each water company are unique. San Jose Water Company and Great Oaks Water Company require an additional check valve after their meter. San

Jose Municipal Water Company requires a “Lead Free Dual Check Valve Backflow Device (or equivalent)”. We will need verification that the correct devices have been represented in the calculations.

- 3.4** Provide documentation for all pipe length equivalents used to develop your calculations. As an Example, Tyco CPVC fittings are “special” in that they get reduced equivalent lengths (for 90° elbow) compared to other manufacturers, you need to provide note on plans and in the calculations that only Tyco CPVC fittings will be used. We will check these in the field, so, the fittings must be readily identified as Tyco CPVC fittings. If not, then you will need to revise your calculations to reflect the “normal” equivalent lengths.
- 3.5** The 2-sprinkler calculation design is contingent on the installation conforming to the situations presented in 2019 NFPA 13D section 10.2. For the situation of flat, smooth, horizontal ceilings with beams at the ceiling, there are a number of variables that could cause many sprinklers to open during a fire. Residential sprinklers must be used in accordance with all of the restrictions of their listing to protect against this circumstance.
- 3.5.1** Referring to 10.2.2 – Some residential sprinklers are listed to specifically protect spaces with compartment features beyond those indicated in 10.2.1(1) through (5) and are permitted for use in accordance with 10.2.2. Some of these sprinklers are listed for a two-sprinkler design. Others are listed for more sprinklers in the design area. In any case, sprinklers used to protect spaces not specifically addressed in 10.2.1(1) through (5) are to be used in specific configurations in accordance with their listing.
- 3.5.2** Referring to 10.2.3 – There are some situations where no listed sprinklers exist for the compartment features under consideration. For example, there may be a single-family residence in which the ceiling height in the family room exceeds 24 ft (7.3 m). For this situation, compliance with 10.2.2 is not possible. Furthermore, if no sprinklers are listed for the ceiling height in question, compliance with 10.2.2 is also not possible. In this case, no standardized guidance on determining the appropriate number of sprinklers exists. However, sprinklers are still required to be installed in the residence in accordance with NFPA 13D. For this situation, the appropriate number of sprinklers for the design area is to be determined through an analysis by qualified individuals in consultation with the SJFD. In making these determinations, consideration should be given to factors influencing sprinkler system performance, such as sprinkler response characteristics, impact of obstructions on sprinkler discharge, and number of sprinklers anticipated to operate in the event of a fire.
- 3.5.3** As indicated in Section 10.2.4 - for situations not meeting one of the conditions in 10.2.1 and 10.2.3, the number of sprinklers in the design area shall be determined in consultation with SJFD as appropriate for the conditions. For the ceiling constructions and room configurations that are beyond the scope of the two-sprinkler discharge criterion referenced in 10.2.1 and 10.2.3, a greater number of design sprinklers and/or higher discharge flows should be considered in the system design. As of this date, there is limited fire test data available to include specific design criteria in this standard. Commonly a 4-sprinkler calculation design has been approved by SJFD as being capable of controlling the fire for 10 minutes and meeting the goals of NFPA 13D where the largest compartment has no more than 4 sprinklers.

4.0 INSPECTIONS

4.1 13D Section 11.2.1.1 **Replaced** with: All piping and attached appurtenances subjected to system working pressure shall be hydrostatically tested at 200 psi and shall maintain that pressure without loss for 2 hours.

4.2 13D Section 11.2.1.2 **Deleted.**

5.0 DOCUMENT REVISIONS

5.1 This document is subject to revisions. For general information and to verify that you have the most current document, see SJFD development website, or call (408) 535-7750 and request the current version date.

SJFD Example for 13D section 6.2.3

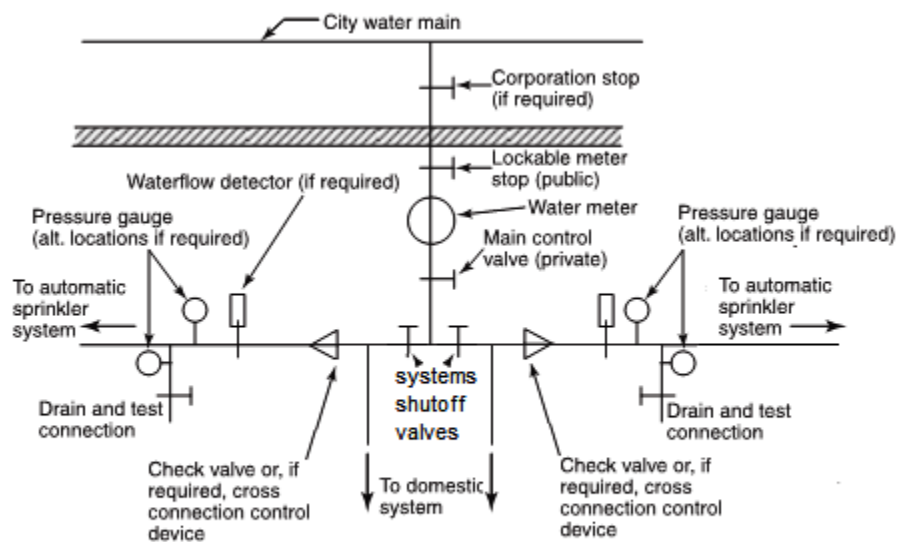


FIGURE A.6.2.3 (SJFD)

Where more than one dwelling unit is served by the same water supply pipe.